Littoral Combat Ship Brief to NIID

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PEO Ships

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U.S. Navy Family of Surface Combatants

- **Assured Access**
  - Undersea Warfare
  - Surface Warfare
- **Power Projection**
  - Navy Fires
- **Projected Defense**
  - Theater Missile Defense

Homel and Defens

- Netted
- Distributed
- Joint

Foundation of LCS Concept and Requirements

- LCS emerged as a result of:
  - Evolving threats, new employment concepts and missions,
  - all based on:

Joint Vision 2020…directed the Services to provide the Joint Force Commander ***the right*** personnel, equipment, and ***supplies in the right place, at the right time, and in the right quantity, across the full range of military operations.***

National Security Strategy said…***transform*** military forces and ***combat capabilities***

Defense Planning Guidance…established a ***new framework*** for change in warfighting capability…***1-4-2-1***

Sea Power 21…described ***what*** capabilities were required of the 21st Century ***surface combatants***

Navy/Marine Corps Global ConOps…described ***how*** the Navy (including LCS) will be ***deployed***

NWDC ConOps…articulated how LCS would be employed

LCS Mission Analysis…***validated*** LCS requirements

Naval Operating Concept…charted way ahead in the near, mid and far term…***including the integration plan fo***

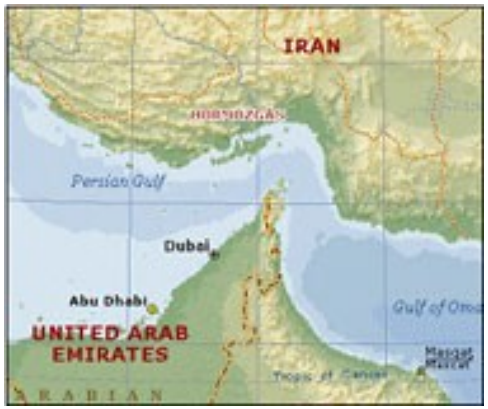
Analysis
Quantified Capability Gap…

Western Pacific Maritime Conflict

- **Anti-submarine Warfare**
  - **Current force:** Acoustic sensor grid needed – requires protracted time to deploy; larger number of ships and air assets needed to respond to ASW threat
  - **Need:** Improved detection, surveillance and prosecution; reduction of torpedo threats

SWA Littoral Chokepoint Conflict

- **Surface Warfare**
  - **Current force:** Insufficient ship speed, close-in firepower and organic anti-Fast Patrol Boat air capability against massed, small attackers
  - **Need:** Substantial kills, improved defense of High Value Units; free multi-mission combatants to other roles
- **MIW**
  - **Current force:** Minehunting is time consuming and asset intensive. Current MCM force cannot support organic systems
  - **Need:** ESG / CSG capable platform; standoff, more systems to bear; accelerate Q-route

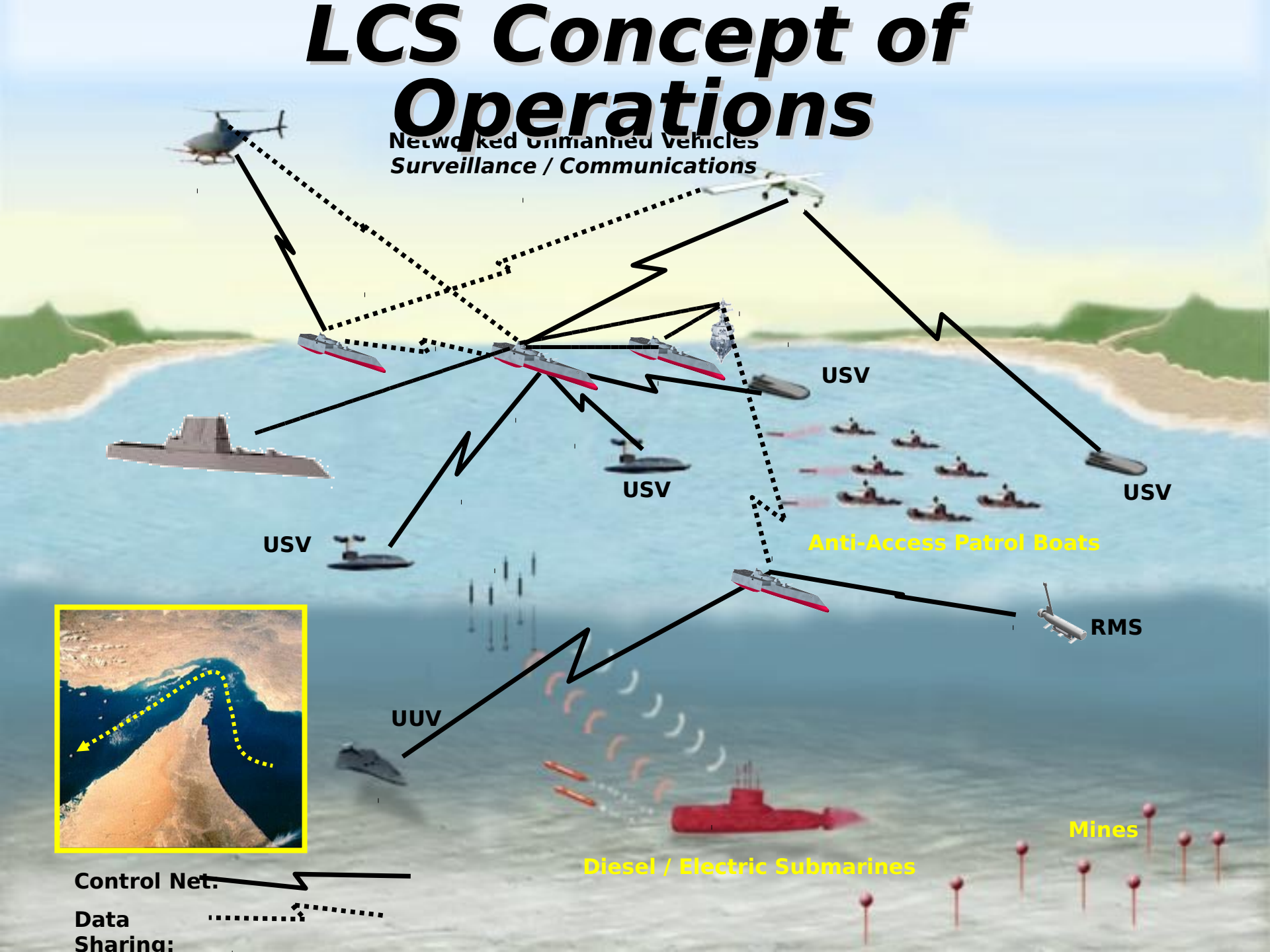


Potential Value of Small, Fast Delivery Pl

Littoral Combat Ship

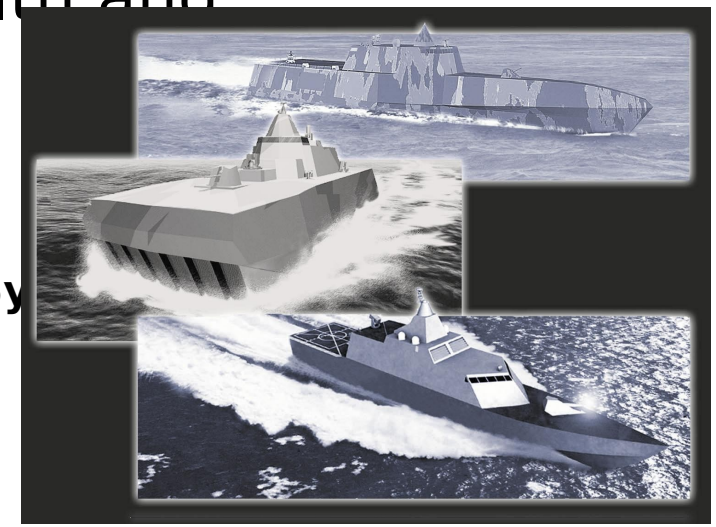
- **A focused mission ship designed to optimize warfighting in the Littoral Battlespace**
  - **Fast**
  - **Maneuverable**
  - **Shallow Draft**
- **Capable of countering enemy asymmetric littoral threats**
  - **Mines**
  - **Small fast surface craft**
  - **Diesel submarines**
- **Self deploying and self sustaining ship**
  - **Not a small craft**
  - **Size not yet determined, but significantly smaller than DD(X) or CG(X)**
- **Innovative hull form / propulsion**
- **Modular mission payloads with Open Systems Architecture**
  - **Mission payloads to provide sensors and combat systems**
  - **Will incorporate advanced unmanned air, surface and underwater vehicles**
  - **Fully netted with the battle force**
  - **Draws upon the capabilities and fire power of multi-mission ships**

LCS Concept of Operations



LCS: Sea Frame

- **Attributes -** Balance of Mission Payload, Capacity, Maneuverability, Stealth and Survivability

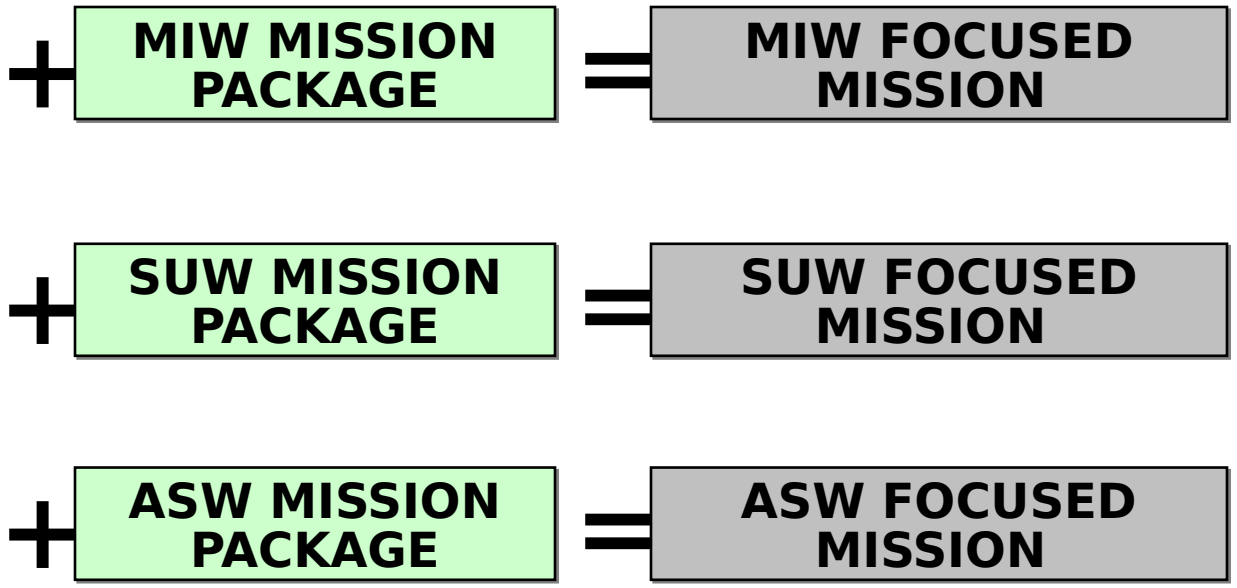


  - **Draft of 20 feet or less**
  - **Innovative Hull Form and Propulsion Sy**
    - **Economical loiter speeds**
    - **Sustained *Battle Group* transit speeds**
    - **High speed sprints of 40-50kts**
    - **Potential Common Hull form:**
      - **USCG Deepwater Project Offshore Patrol Vessel**
      - **FMS**
  - **Signature – Management Technologies to minimize**
    - **Infra-red, acoustic, magnetic, radar and wake emissions**
  - **State-of-the-art Damage Control Technology and Self-Defense Systems**
  - **Mission manned**

Core Systems & Focused Mission Packages

CORE SYSTEMS

- Self Defense
- Navigation
- C4
- Mine Avoidance
- Torpedo Detection & Avoidance
- Warning Shots
- Detect, ID, & track Surface Contacts
- Limited ISR
- Core Crew

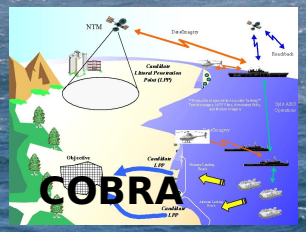


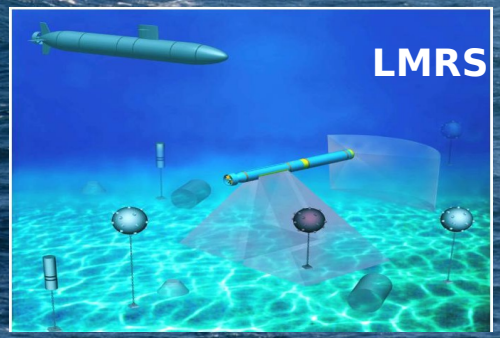
Littoral Combat Ship Flight 0 Specific Characteristics

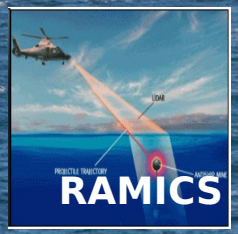
Characteristics	Threshold	Objective
Hull		
Draft @ FLD (ft)	20	10
Service Life (yrs)	20	30
Mission Package Payload[1] (mt)	180 (105 Mission Package / 75 Mission Package Fuel)	210 (130 Mission Package / 80 Mission Package Fuel)
Propulsion & Engineering		
Sprint Speed @ FLD (kts) in SS3	40	50
Range @ Sprint Speed[2] (nm)	1000	1500
Range @ Economical Speed w/ Payload (nm)	3500 @ >18	4300 @ 20
Aviation Support		
Embark and Hangar	(1) MH-60 R/S and VTUAVs	(1) MH-60 R/S and VTUAV,
Flight Deck	Operate, fuel, reconfigure and support MH-60 R/S and UAVs / VTUAVs	Operate, fuel, reconfigure and support MH-60 R/S and UAVs / VTUAVs
Launch and Recover Aircraft (Best Heading)	SS4	SS5
Water Craft Support		
Boat Type	11m RHIB	40ft High Speed Craft
Launch and Recover (Best Heading)	SS3 in 45 min	SS4 in 15 min
Logistics		
Provisions (days)	14	21
UNREP	CONREP, VERTREP and RAS	CONREP, VERTREP and RAS
Core Crew Size	50	15
Crew Accomodations	75	75
Mission Reconfiguration (days)	4	1

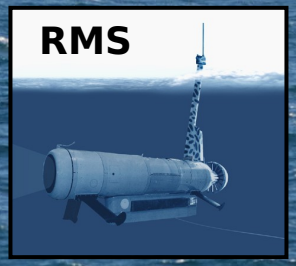
Note 1. Mission Package Payload = all non-core systems, vehicles, helicopters, ordnance and associated personnel, equipment and containers and fuels to perform a single mission
2. Includes payload, where payload = heaviest possible mission package and core mission systems, but excludes ship's fuel

Mission System Packages That Can fill the Gap









Analysis of Systems vs Capability Gaps will Identify Optimal System

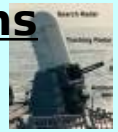
Notional Modular Mission Payloads

External Sensors

- Adv. Surface / Air Search Ra
- Electro-Optical Sight System

Weapons

Self Defense Countermeasures

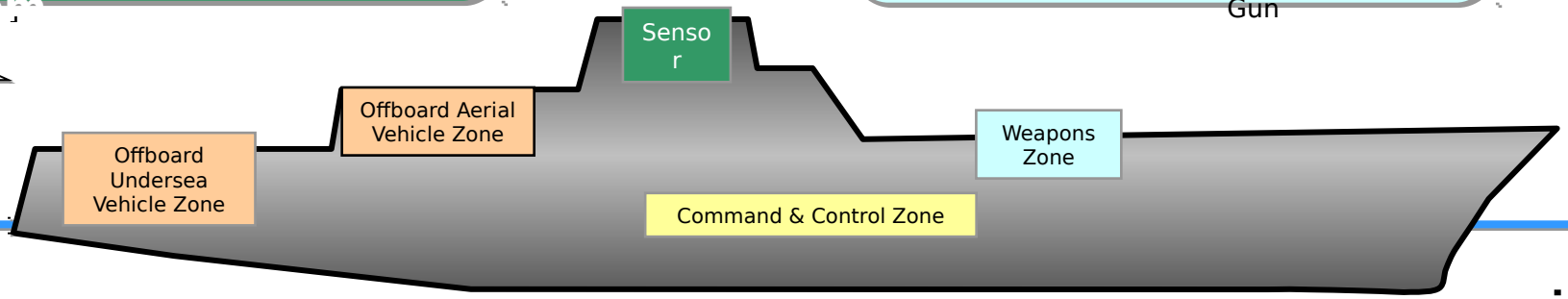


Self Defense Gun

Self Defense Missile

Platform And Core Mission Systems

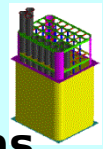
Mission Module Systems



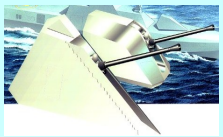
Offboard Vehicles

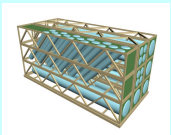
Command & Control

- Self Defense Weapon Control
- Electronic Warfare Systems
- ASW Weapon Control



Weapons





CONOPS
Modular Mission Capabilities

Mine Counter Measure package

- ✓Provide organic punch through capability.
- ✓Search, map, avoid with limited neutralization.
- ✓Support remote & autonomous UVs and operate helos.
- ✓Massed LCS Division = Dedicated MCM capability.

- ✓Integrated with multiple off-board sensor systems.
- ✓Automatic on-board processing.
- ✓Helicopter(s).
- ✓Permits dedicated LCS ASW division.

Small boat prosecution package

- ✓"Need to engage from close aboard to over-the-horizon".
- ✓Stabilized gun and missile system.
- ✓Integrated with EO/IR system.
- ✓Include non-lethal capabilities.
- ✓Helos & off-board systems

Inherent missions

- ✓SOF
- ✓Maneuver, logistics, replenishment
- ✓NEO
- ✓MIO
- ✓Medical …

Missions made possible by the removal of focused mission modules .

Experimentation Lessons Learned

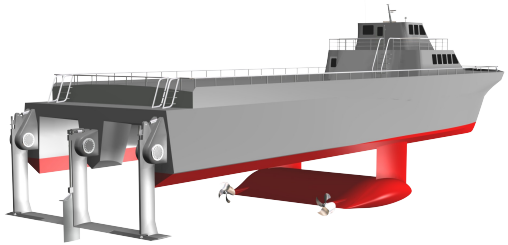
- **HSV-X1 & X-2 / Westpac Express**
  - Structural design
  - Seakeeping
  - Launch and recovery of vehicles
- **SKJOLD**
  - SES technology
  - Composite design and construction

- **VISBY**
  - Composite design and construction
- **SLICE**
  - Structural design
  - Diesel exhaust
  - Hydrodynamic drag

- **TRITON**
  - Trimaran design, construction, operations
  - Seakeeping and structural performance

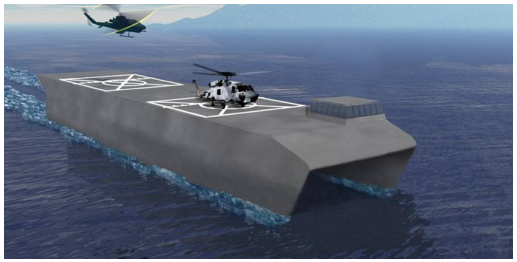
ONR Development of Small High Speed Vessels

Hybrid Small Water Plane Area Craft Plus (H
(Reconstruction of SES-200) "SEA FLYER"



Lessons	Characteristics
Evaluate Lifting Body Tech Test Advanced Ride Ctrl Sys Evaluate Propulsion Sys (Propulsors Integral to Lifting Body)	Length – 160ft Displ – 340LT Beam– 40ft Spd – 30+kts Deliver & test Nov 03

X-Craft
(Previously "Littoral Surface Craft (Experimental) (LSC(X))")



Lessons	Characteristics
Test Lifting Body Tech Test advanced hull form Eval. miss. modularity capabilities Eval. advanced Catamaran hull form Eval. active polymer drag reduction Gain experience w/ design & const under ABS rules	Length – 239ft Displ – ~1,200LT Beam – 72ft Spd – ~40-50kts Endurance – 4000nm All aluminum construction Deliver and test Nov 04

Small High Speed Vessels Development and Test Serve as ACTD Leading to LCS

Family of Ships Concept Studies Status

- ☑ **Six contracts ($500K each) awarded 08 Nov 02**
  - **Bath Iron Works**
  - **Gibbs & Cox**
  - **JJMA**
  - **Lockheed Martin**
  - **Northrop Grumman**
  - **Textron**
- ☑ **Interim design review mid-December 02**
- ☑ **Final design review mid-January 03**
- ☑ **90-day study completed on 06 Feb 03**


Ship Concept Studies

FY05 Construction Start Acquisition Strategy

- **Two step process to begin construction of first ship in FY05**
  - **Downselect to three industry teams to prepare preliminary designs**
  - **Source selection panel selects preliminary design(s) for Detailed Design and Construction**
- **Ship size allows smaller shipyards to facilitate ship development and procurement which is conducive to multi-national and US collaboration and teaming**
- **LCS to be procured in flights with follow-on ships incorporating new technologies through spiral development**

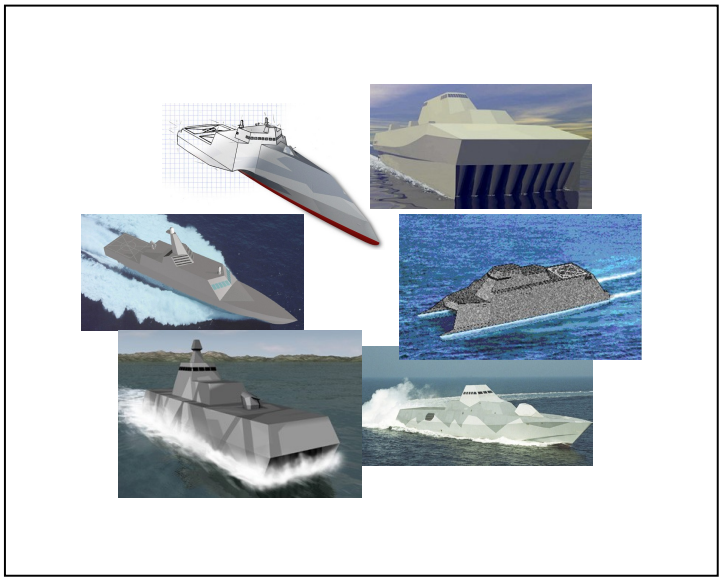
Mid-term Schedule

- **Preliminary design 17 Jul 03 – 11 Feb 04**
- **1st update / contract modification for option items 15 Oct 03**
- **Final update / contract modification for option items 01 Dec 03**
- **Industry submit proposals for next phase 31 Dec 03**
- **Downselect to one or two for final design 03 May 04**
- **Exercise 1st construction option 18 Jan 05**
- **Exercise 2nd construction option 31 Dec 05**

Littoral Combat Ship

LCS Road Ahead

6 Industry Concepts
(06 Feb 03)



3 Preliminary Designs
(19 Jul 03)

1 or 2 Final Design(s)
(Contract Award April 2004)

Flight 0 Construction Start
(Contract Award January 2005)

February 2003 — ***July 2003*** — ***April 2004*** — ***January 2005***

First Ship in the Water in 2007

LCS Mission Systems and Ship Integration Team (MSSIT)

- Integrated Product Team (IPT) comprised of Government and Industry Reps
- Reports to the LCS Program Manager
- Integration efforts:
  - Develop & maintain Technical Architecture for LCS Mission Systems (Interface Control Document (ICD))
    - ★ Targeted Interface Development
      - » JUSC2 ACTD, Others
  - Spiral Development & Technology Management
    - ★ Flight 0 Mission Module offsites
  - T&E / experimentation

Potential International Cooperative Opportunities

- Industry to Industry teaming on U.S. LCS design / construction
- Industry to Industry teaming on Mission Module design / construction
  - Surf Zone mine threat modules
  - Anti diesel submarine threats modules
  - Anti small fast surface craft modules
- Industry to Industry teaming / data exchange
  - Hull forms
  - Composites
  - Propulsors
  - Signature management
  - Human Systems Integration
  - Remote sensors
  - Other technologies

ICOG

- **Germany**
  - **Future Propulsion and Power Generation Technologies**
    - ★ **Naval applications for HTS technologies and Fuel Cell implementation. Demonstrate the feasibility under system design aspects**
  - **COLDS (Common Opto-electronic Laser Detection System)**
    - ★ **Demonstrate the Laser Warning and ECM System**
- **United Kingdom**
  - **LCS Modular Mission Concept**
    - ★ **Cascading modularity study. Study modularity using subsystems within a module. Identify ways to generate a maximum number of options to meet various mission requirements (“Box in a Box”- Concept, Configurability Concept)**
- **Italy**
  - **Gun Modules and Extended Capability**

ICOG (cont)

- **France**
  - **Integrated Antenna System (IAS)**
    - ★ **Study and demonstrate future and expected capabilities (using e.g. a part of the total antenna concept)**
  - **UAV Recovery Underway**
    - ★ **Study of recovery of different types of UAV's**
    - ★ **Collect and evaluate information available at nations / companies**
    - ★ **Design a gun module as an example of modularity**
  - **Damage Control vs Manpower Requirement (assisted by Netherlands)**
    - ★ **Summarise results of available studies / concepts, collate information available in member nations' studies, possible workshop with industries**
- **United States**
  - **Interfaces, Standards and Interoperability & Open Systems Architecture (OSA)**
    - ★ **Report on availability of existing standards; identify needed additional standards; provide broad plan to implement a modularity concept with emphasis on system design aspects**
  - **Rules, Regulations and Standards for Composite Materials and Structures**
    - ★ **Study and collate standards incl. capabilities of Classification Societies; identify new standards needed; develop, plan and initiate pertinent publication process**

Potential International Cooperative Opportunities (cont)

- Vehicles for communication
  - Navy IPO and NIID process
  - Direct Industry dialog
  - Web page establishment for initial dialog, introductions
    - » WWW.LCSSHIP.COM
  - ICOG

Summary

- **U.S. Navy is Committed to a Littoral Combatant to Address Asymmetric Threats in the Littorals**
- **LCS Program Provides a Vehicle for Collaborative International Teaming in a Variety of Ways.**
- **Littoral Combatant Expertise is Extensive in Several Navies. The U.S. Navy and U.S. Industry would like to Learn from that Experience Base.**

BACKUP

LCS Integrated Schedule

(FY05 Flight 0, FY08 Flight I)